DAW
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BOUND BROOK SAMPLING AND EDIBLE FISH TISSUE DATA REPORT
CORNELL-DUBILIER ELECTRONICS SITE
SOUTH PLAINFIELD, NJ

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1.0 INTRODUCTION

1.1 Objectives

The objectives of this project were to collect fish tissue data relevant to human health evaluations and to conduct a risk assessment for the Bound Brook and its associated stream corridor (wetlands and flood plains) adjacent to and downstream of Cornell-Dubilier Electronics, South Plainfield, NJ. Abiotic (sediment, soil, and water) and biotic samples (fish, crayfish, and small mammals) were collected, analyzed for chemical contaminants, and the results used to determine the ecological risk to biota. The ecological risk assessment was performed following the guidelines and procedures contained in the United States Environmental Protection Agency (U.S. EPA) Risk Assessment Guidance for Superfund (U.S. EPA 1997a). The goal of the risk assessment is to establish the degree of impacts (chronic, acute, or imminent hazards) to the system and, if impacts are observed, to provide ecological clean-up criteria. A bottom feeding and predatory fish species was also collected adjacent to and downstream of the site, analyzed for chemical contaminants, and the results provided to U.S. EPA Region II for the purposes of human health exposure evaluation.

The purpose of this report is to present the design and implementation of the study as discussed above. In order to present the data in a timely manner, this report only presents the PCB and pesticide results for edible fish tissue.

1.2 Site Background

The Cornell-Dubilier Electronics Site is located at 333 Hamilton Boulevard in South Plainfield, Middlesex County, New Jersey. The site occupies approximately 25 acres in an industrial, commercial, and residential area. It is bordered by commercial businesses and residences from the south to the north, and wetlands and an unnamed tributary to the Bound Brook from the southeast. Conrail railroad tracks crisscross the unnamed tributary just north of the site. Other industries are scattered to the northeast and east of the site on the opposite side of the railroad tracks (U.S. EPA 1997b).

During its years of operation at the site (1936 to 1962), Cornell-Dubilier Electronics, Inc. manufactured electronic parts and components, including capacitors. It is reported that transformer oils were tested for an unknown period of time during their operations until they vacated the site. It is alleged that during their operations, Cornell-Dubilier Electronics, Inc. dumped PCB-contaminated materials and other hazardous substances directly onto site soils (U.S. EPA 1997b).

Historical aerial photographs reveal evidence that extensive filling operations were underway at the site in the 1940's possibly to support construction of a railroad spur to the operating facility at that time. A title search indicates that the Spicer Manufacturing Corporation, later known as Dana Corporation, owned the property during this period (U.S. EPA 1997b).

The site is currently known as the Hamilton Industrial Park and is occupied by an estimated 15 commercial businesses. Through the years, dozens of companies have operated at the site as tenants. Currently, other than a fenced area where a truck driving school operated until early of October 1996, the property is unsecured (U.S. EPA 1997b).

1.3 Site Description

It is estimated that approximately 540 persons reside within 0.25 miles of the site, with the nearest residential homes being located on Spicer Avenue and on the opposite side of Hamilton Boulevard, less than 200 feet from the site. The total population estimated to live within one mile of the site is 8,700 persons (U.S. EPA 1997b).

The Bound Brook traverses the southeast corner of the site property. Stream width varies from 10 to 20 feet across the site, with a varying depth of approximately 1 to 3 feet. The Cedar Creek flows into the Bound Brook approximately 0.75 miles before emptying into New Market Pond. Surface water flow from New Market Pond travels approximately 8.5 miles before discharging into the Raritan River. All of the above-mentioned water bodies are designated by the State of New Jersey for the maintenance, migration, and propagation of the natural and established biota. There are no surface water intakes along this flow path for at least 15 miles. However, these water bodies are reportedly utilized as freshwater fisheries (U.S. EPA 1997b).

There are approximately 34 acres of wetlands within 0.5 miles of the site. Wetlands that border the site to the southeast diminish significantly as the creek heads downstream towards the northwest (U.S. EPA 1997b).

An unknown source investigation conducted by the NJ Department of Environmental Protection (DEP) in the vicinity of Hamilton Boulevard during the period of 1988-1991 revealed significant ground water contamination consisting of mainly trichloroethene (TCE) and tetrachloroethene (PCE). Samples collected from a shallow (70 feet) residential potable well located approximately 500 feet west of the site revealed TCE (6,850 micrograms per liter [μg/L]) and PCE (12.6 μg/L) contamination. Due to widespread contamination, all residential wells in the area were reportedly closed and residences were hooked up to a water main providing potable water from another location. Although the site was considered to be one of several potential sources, to date, the source of the contamination has not been identified (U.S. EPA 1997b).

1.4 Project Scope

This investigation involved the collection and analysis of soil, sediment, water, and biota (fish, crayfish, and small mammals) along a distance and/or a PCB concentration gradient adjacent to and downstream of Cornell-Dubilier Electronics, Inc. A reference station was established upstream of the site which exhibited similar habitat as the potentially impacted areas. Sample stations were selected based upon a contaminant concentration gradient and similar habitat between sample stations. The contaminants of potential concern (COPCs) included target compound list (TCL) PCBs, TCL pesticides, target analyte list (TAL) metals, TCL semivolatiles [e.g., polyaromatic hydrocarbons (PAHs), base-, neutral-, and acid-extractable (BNA) compounds, creosotes] and TCL volatile organic compounds (VOCs). Additional parameters measured included water quality (temperature, dissolved oxygen, pH, and conductivity) and in soil/sediment grain size, total organic carbon (TOC), and total petroleum hydrocarbon (TPH). Additional sediment samples were collected at four sample stations (including a reference location) for an amphipod (*Hyalella azteca*) chronic toxicity test and an amphibian embryo toxicity test.

Where the collection of the targeted biological samples was not feasible, the required data will be inferred from other available biota. Preliminary sampling (field verification) was performed prior to the start of the field investigation to verify and refine the sampling design and delineate the downstream extent (to New Market Pond) of contamination. The area evaluated was determined based upon the results of the preliminary sampling. The intent of the investigation and risk assessment were to establish and characterize a dose-response relationship between the contaminants released from the site and biota utilizing the Bound Brook and its associated stream corridor.

Ecological risk will be evaluated for the site, the Bound Brook and its associated flood plains. Assessment endpoints were selected based on site contaminants and ecosystems or communities that were believed to be at risk. After the assessment endpoints were selected, a site conceptual model was developed to trace the contaminants from the source through the biotic system. Once the conceptual model and assessment endpoints were determined, the testable hypotheses were developed. Testable hypotheses are specific question(s) for each assessment endpoint that were used to evaluate each of the assessment endpoints. From this information, specific measurement endpoints were determined.

Measurement endpoints are a specific component in the system that can be evaluated (i.e., measured, quantified, and/or qualified) and, based on this evaluation, provides the information required to evaluate each of the testable hypotheses and assessment endpoints. A weight of evidence approach will be used when multiple measurement endpoints were used to evaluate a single testable hypotheses and/or assessment endpoint.

2.0 TECHNICAL APPROACH

The results of the preliminary risk assessment conducted by the U.S. EPA Region II indicated that a field investigation was appropriate to collect additional site information. This involved the collection of soil, sediment, surface water, and biota. In addition to chemical analyses, the physical samples were analyzed using toxicity testing. A description of each task is listed below.

2.1 Preliminary Sampling

Prior to this field investigation, preliminary soil and sediment sampling was conducted downstream of the Cornell-Dubilier Electronics Site to the east end of New Market Pond. The objective of the preliminary sampling was to evaluate the downstream extent of PCB and metals contamination. The data were evaluated using screening methods; no validation of the data was performed. The results of the preliminary sampling was used to select sample locations for this current investigation.

2.2 Soil Sampling

Six replicate soil samples were collected from each of the four terrestrial sample areas (T1, T2, T3, and T4 [reference area]). These samples were used to characterize the chemical concentrations in the soil for each of the four sample areas. The locations of the soil samples were randomly selected within the small mammal trapping grids (Section 2.8). Soil samples were analyzed for PCBs, pesticides, metals, volatile, semivolatiles, grain size, and TOC.

Soil samples were collected in accordance with ERTC/REAC SOP #2012, *Soil Sampling*. Soil was collected using a decontaminated stainless steel trowel or bucket auger to a depth of 6 inches. The soil within a 1.5 foot by 1.5 foot area was collected and accumulated into a labeled 5-gallon decontaminated stainless steel bucket until sufficient sample volume was obtained for all required toxicity testing and chemical analyses. The sample was transported to the staging area, mixed, and divided among the appropriate sample containers. The soil samples were maintained and shipped on wet ice prior to analysis.

2.3 Sediment Sampling

Two replicate sediment samples were collected from each of the eight sample locations [A1 (adjacent to the site), A2 (below Veterans Park), A3 (Clinton Avenue Bridge), A4 (New Brunswick Avenue Bridge), A5 (east New Market Pond, A6 (west New Mark Pond), A7 (below spillway), and A9 (reference area)]. Aquatic sample locations are specified in Figure 1. These samples were used to characterize the chemical concentrations in the sediment for each of the sample areas. Sediment samples were analyzed for PCBs, pesticides, metals, semivolatiles, volatiles, grain size, and TOC. At sample locations where toxicity tests were going to be performed, sediment samples were also analyzed for ammonia and TPH.

Sediment samples were collected in accordance with ERTC/REAC SOP #2016, *Sediment Sampling*. Sediment samples were collected using a decontaminated Ponar dredge or stainless steel trowels and accumulated into a stainless steel bucket until the volume was sufficient to meet analytical and toxicity testing volume requirements. The bulk sample was then covered and returned to the staging area. After the sediment was homogenized, the sample was placed in appropriately labeled sample containers for chemical analyses and toxicity testing. The samples were maintained on wet ice until they were shipped to the specified laboratory via overnight courier for analysis.

2.4 Surface Water Sampling

A surface water sample was collected from each of the eight sample locations [A1 (adjacent to the site), A2 (below Veterans Park), A3 (Clinton Avenue Bridge), A4 (New Brunswick Avenue Bridge), A5 (east New Market Pond, A6 (west New Mark Pond), A7 (below spillway) and A9 (reference area)]. Aquatic sample locations are specified in Figure 1. Surface water samples were analyzed for PCBs, pesticides, metals (total and dissolved), semivolatiles, and VOCs.

Surface water samples were collected directly into the sampling container following ERTC/REAC SOP #2013, *Surface Water Sampling*. Water samples were collected upstream of any river disturbances being caused by the sampler. The surface water samples being analyzed for dissolved metals were filtered prior to analysis. All samples were maintained and shipped on wet ice prior to analysis. Samples being analyzed for metals were preserved using 40 percent nitric acid to a pH of less than 2 units.

Concentrations in the surface water samples were compared to criteria guidance values contained in the "Surface Water Quality Standards - Criteria Currently Applicable to New Jersey Surface Water, January 30, 1997."

Water quality parameters were measured using a Horiba U-10. The water quality parameters evaluated included temperature, pH, dissolved oxygen, and conductivity. The instrument was calibrated prior to data collection as per the manufacturer's operating manual.

2.5 Toxicity Evaluations

The sediment toxicity testing included a 14-day chronic toxicity test using juvenile amphipods (*Hyalella azteca*) and 10-day static embryo toxicity test using the leopard frog (*Rana pipiens*). Six locations adjacent to and downstream of the site (A1, A2, A3, A4, A5, and A6), a reference (A9), and a laboratory control were evaluated by each of these tests.

2.5.1 Amphipod

The amphipod toxicity tests were subcontracted to a laboratory with documented experience of performing the test. The toxicity tests included four replicates per sample location and four replicates using a laboratory control. Each replicate contained twenty 2nd or 3rd instar amphipods. Toxicity were evaluated for 100 percent site sediment only; no sediment dilutions were used. Approximately 40 percent of the overlying water volume was replaced on day 2, 4, 6, and 8 in a way that minimized turbulence and disturbance of the sediment. Dissolved oxygen and pH were measured in each replicate immediately before and after each renewal. The organisms were fed periodically with a suitable food at a rate sufficient to support growth without resulting in fungal production. Control mortality must not have exceeded 20 percent. The endpoints measured by the subcontract laboratory included mortality (percent mortality) and growth (total length). The toxicity test followed ERT/REAC DRAFT SOP, *10-Day Chronic Toxicity Test Using Amphipods (Hyalella azteca)*. Any deviation from the SOP was reported by the subcontract laboratory in the toxicity evaluation report.

Statistical comparisons will be used to determine if there was a significant difference ($\alpha = 0.10$) in any of the measurement endpoints (e.g., growth, mortality) between either the laboratory control or a reference locations and any of the on-site sample locations. A Dunnett's one-sided test was utilized for the analyses. If any of the assumptions required for the Dunnett's test were not met (i.e., normality and homogeneity of variances), a Dunnett's test on the ranks was used to provide a non-parametric, distribution-free comparison of the means.

If significant differences are observed between any of the sampling locations adjacent to the site and either the laboratory control or the upstream reference locations, the test species was considered to be impacted at that sample location. The impact may be related to exposure to contaminants or to differences in sediment matrices or physical characteristics. Correlation analyses was used to determine if the impacts were related to the concentrations of any of the contaminants or physical characteristics of the sample that were measured.

2.5.2 Leopard Frog

The toxicity evaluation using *R. pipiens* exposed individual fertilized eggs from each species to site sediment collected from several contaminated locations. No less than 10 eggs per concentration with 3 to 5 concentrations will be tested over an arithmetic range of one order of magnitude (e.g., 10, 25, 50, 75, and 100 percent site sediment). The definitive study was designed to expose organisms to a range of doses that will produce intermediate numbers of individuals exhibiting adverse reactions. The definitive studies will use approximately 30 eggs per concentration. This allowed for 3-10 egg (one egg per vial) replicates for each concentration. Approximately 40 percent of the overlying water volume was replaced on day 2, 4, 6, and 8 in a way that minimized turbulence and disturbance of the sediment. Dissolved oxygen and pH will be measured in each replicate immediately before and after each renewal. Eggs will be monitored daily for developmental delays, lesions, percent hatch, and percent mortality. Control mortality must not have exceeded 20 percent. At the end of the 10-day test, the embryo will be transferred to clean rearing solutions and monitored for survival for 3 days post hatch. Lesions will be described using an alpha-numeric scheme that indicates organ or body part, general conditions, colors, severity, position, and description. In addition, a description of the craniofacial effect, the cardiovascular effect, and the skeletal value effect will be described.

Statistical comparisons will be used to determine if there was a significant difference ($\alpha = 0.10$) in any of the measurement endpoints (e.g., growth, mortality) between either the laboratory control or a reference locations and any of the on-site sample locations. A Dunnett's one-sided test will be utilized for the analyses. If any of the assumptions required for the Dunnett's test are not met (i.e., normality and homogeneity of variances), a Dunnett's test on the ranks was used to provide a non-parametric, distribution-free comparison of the means.

If significant differences are observed between any of the sampling locations adjacent to the site and either the laboratory control or the upstream reference locations, the test species will be considered to be impacted at that sample location. The impact may be related to exposure to contaminants or to differences in sediment matrices or physical characteristics. Correlation analyses will be used to determine if the impacts are related to the concentrations of any of the contaminants or physical characteristics of the sample that were measured.

2.6 Fish Collection

2.6.1 Edible Fish

Fish were collected in conjunction with U.S. EPA Region II from seven locations, including one upstream reference area (A9), from Bound Brook and New Market Pond using electrofishing techniques (Figure 1). The objective of the sampling was to collect edible-size bottom feeding fish (carp and white suckers) and predatory fish (sunfish and largemouth bass) of similar size between the sample locations. A maximum number of three replicates were collected for each species from each sample location but not all species were caught at all locations (e.g., largemouth bass were collected only at locations A5 and A6).

The sampling crew taxonomically identified the fish, removed several scales for aging, measured the length and weight of the fish, and performed a gross pathology evaluation. The fish were prepared following the U.S. EPA Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories (1993). Fish with scaled prior to filleting. Each fillet sample represented a single fish; no sample compositing was required to meet analytical mass requirements. The fillets were weighed, then wrapped in aluminum foil, placed in a plastic bag, and maintained on wet ice. Fish were delivered to the REAC Biological Assessment Laboratory in Edison, NJ for chemical analysis. Fish tissue were analyzed for metals, PCBs, pesticides, percent lipids, and percent moisture. The data will be used by Region II U.S. EPA for a human health risk assessment.

2.6.2 Forage Fish

Forage fish were collected from six locations (A1, A2, A3, A4, A5, A6) adjacent to and downstream of the site and from an upstream reference area (A9) using electrofishing. Based on electrofishing results, the pumpkinseed was selected as the forage fish; it was most consistently captured at each of the sample locations.

Captured fish were placed on wet ice and transported to the REAC Biological Assessment Laboratory, Edison, NJ. Up to eight replicates were collected from each of the sample locations. The digestive tract was removed, and the fish was weighed and placed in aluminum foil. Fish were only composited if required to meet analytical mass requirements. The fish were submitted to a subcontract laboratory for chemical analyses (PCBs, metals, pesticides, percent lipids). Voucher specimens for taxonomic identification were also collected and preserved in 2-propanol (isopropyl alcohol).

2.7 Crayfish Sampling

Crayfish were collected from six locations (A1, A2, A3, A4, A5, A6) adjacent to and downstream of the site and from an upstream reference area (A9). Crayfish were collected using electrofishing and crayfish traps baited with cat food. The taxon and weight was determined for each specimen collected. All captured crayfish were placed in 2-gallon decontaminated plastic buckets (hereafter referred to as depuration chambers) per location and maintained live in reference water for depuration. Aeration was provided to each chamber with an aquarium air pump and air stone. The crayfish were allowed to depurate in this manner for 18 to 20 hours after capture to remove sediments entrained in the digestive tract.

Depending upon trapping success, up to eight specimens were retained per location for chemical analyses (PCB, metals, pesticides, semivolatiles, and percent lipids). Crayfish were only composited if required to meet analytical mass requirements. After the depuration, each specimen was sacrificed, weighed, measured, and wrapped in aluminum foil. The samples were placed on wet ice and shipped to the subcontract laboratory for whole body homogenization and analysis. Voucher specimens for taxonomic identification were collected and preserved in 2-propanol (isopropyl alcohol).

2.8 Small Mammals

Four areas were trapped, three locations (T1, T2, and T3) adjacent to and down gradient of the site and one reference area (T4). The intent of the trapping was to collect eight adult white-footed mice (*Peromyscus leucopus*) from each area (32 mammals total). All field trapping activities were conducted in accordance with ERT/REAC SOP #2029, *Small Mammal Sampling and Processing*.

Sampling was performed using Museum Special traps and Sherman traps set in grids. All traps were spaced 15 feet apart and baited with a rolled oats and peanut butter mixture. The traps were checked in

the morning and evening for a maximum of a 3-night trapping period. Traps were rebaited as necessary. Recovered animals were labeled and stored on wet ice in coolers before processing. Trapping was terminated in each area once a sufficient number of specimens were collected.

Specimens were then transported to the REAC Biological Assessment Laboratory, Edison, NJ in coolers on wet ice for processing. The metrics recorded included total body weight, body length, tail length, ear length, body weight, liver weight, and kidney weight. Liver and kidney sections (approximately 0.5 g each) were collected for histopathological analyses, and preserved in a labeled 40-mL glass vial filled with 10 percent buffered formalin. Gross necropsies were then conducted, and the gastrointestinal contents of each animal were removed (stomachs were emptied, rinsed with distilled water and returned). Up to eight specimens from each area were submitted for histopathological evaluation and residue analysis. All observations and measurements were recorded on ERTC/REAC small mammal data sheets.

After processing all specimens were placed in labeled self-sealing plastic bags, and maintained on dry ice prior to being shipped to a subcontract laboratory for residue analyses. A whole body tissue homogenate was prepared and the frozen homogenate was submitted for PCB, metals, pesticide, and percent lipid analyses.

Preserved liver and kidney sections were collected from each specimen and submitted to a subcontract laboratory for histopathological analysis. The results were related to contaminant concentrations in the tissue, and exposure concentrations of the site soil.

2.9 Sampling Equipment Decontamination

The following sampling equipment decontamination procedure was employed prior to and subsequent to sampling each station in the following numerical sequence:

1. physical removal
2. nonphosphate detergent wash
3. potable water and distilled water rinse
4. 10 percent nitric acid rinse
5. solvent rinse [acetone]
6. distilled water rinse
7. air dry

2.10 Standard Operating Procedures (SOPs)

2.10.1 Documentation

Documentation was completed as per the following SOPs:

- ERT/REAC SOP #2002, *Sample Documentation*
- ERT/REAC SOP #4001, *Logbook Documentation*
- ERT/REAC SOP #4005, *Chain of Custody Procedures*

2.10.2 Sample Packaging, Shipment, Storage, Preservation, and Handling

Sample packaging, shipment, storage, preservation and handling was conducted in accordance with the following SOPs:

- ERT/REAC SOP #2003, *Sample Storage, Preservation and Handling*
- REAC SOP #2004, *Sample Packaging and Shipment*

2.10.3 Field Sampling and Analytical Techniques

Field sampling activities and field analytics was conducted in accordance with the following SOPs:

- ERT/REAC SOP #2001, *General Field Sampling Guidelines*
- ERT/REAC SOP #2005, *Quality Assurance/Quality Control Samples*
- ERT/REAC SOP #2006, *Sampling Equipment Decontamination*
- ERT/REAC SOP #2012, *Soil Sampling*
- ERT/REAC SOP #2013, *Surface Water Sampling*
- ERT/REAC SOP #2016, *Sediment Sampling*
- REAC SOP #2019, *Surface Geophysics*
- ERT/REAC DRAFT SOP, *10-Day Chronic Toxicity Test Using Amphipods (Hyalella Azteca)*
- REAC DRAFT SOP, #2029, *Small Mammal Trapping and Processing*

2.10.4 Health and Safety

Health and Safety was conducted in accordance with the following SOP:

- REAC SOP #3001, *REAC Health and Safety Program Policy and Implementation*
- REAC SOP #3012, *REAC Health and Safety Guidelines at Hazardous Waste Sites*
- REAC SOP #3001, *Inclement Weather, Heat Stress and Cold Stress*

3.0 RESULTS

3.1 Preliminary Sampling

The results of the preliminary sampling was used to evaluate the extent of PCB and metal contamination downstream and down gradient of the Cornell-Dubilier Site. Based upon the chemical concentrations in the soil and sediments, it was determined that PCB contamination extended from the site to the east end of New Market Pond (Figure 1). The PCB (Aroclor 1254) concentrations were up to 13,000 parts per billion (ppb), wet weight (w.w.) in the sediment and up to 6,200 ppb, w.w., in the flood plain soils (Table 1). Copper, zinc, lead and barium were also detected in soil and sediment samples at concentrations up to 210, 620, 540, 380 parts per million (ppm), w.w., respectively. These data were used to select sampling locations for this investigation.

3.2 Edible Fish

Edible fish (carp, white sucker, pumpkin seed, and largemouth bass) were collected from six locations (A1, A2, A3, A4, A5, A6) adjacent to and downstream of the Cornell-Dubilier Electronics site and from a upstream reference area (A9) (Figure 2). Prior to analysis, the fish were weighed (total weight and fillet weight) and measured (total length, fork length, and standard length) and the results are in Appendix A, Fish Metrics.

Polychlorinated Biphenyls (PCBs), Aroclor 1248 and Aroclor 1254, were detected in all fillet samples in all species (Table 2). In general, Aroclor 1254 was found at higher concentrations then Aroclor 1248. Seven pesticides (heptachlor epoxide, g-chlordane, a-chlordane, p, p'-D D E, p, p'-D D D, endrin aldehyde, methoxychlor) were also detected in the edible fish samples (Table 3). Methoxychlor was mostly likely a laboratory contaminant since it was detected in the laboratory blanks and only in one sample at concentrations near the detection limit. Heptachlor epoxide was detected in most frequently in the samples (85 percent) followed by p,p'-D D E (73 percent). In addition to being frequently

detected, both of these compounds were detected in samples from all locations, with the exception of p,p'-D D E which was not detected at location A-5. The remaining pesticide compounds were detected less frequently (g-chlordane, 17 percent of the samples; a-chlordane, 13 percent of the samples; p, p'-D D D, 19 percent of the sample locations; and endrin aldehyde, 17 percent of the sample locations). In addition to be less frequently detected, these compounds were also detected at less than half of the sample locations (g-chlordane and a-chlordane was only detected at locations A1 and A9; p,p'-D D E was only detected at locations A1, A4, and A9; and endrine aldehyde was only detected at locations A5 and A6).

Tables 3 and 4 provide summary statistics [mean, standard deviations (n-1), and sample size] for each compound in each species at each location for PCBs and pesticides, respectively. In general, the highest PCB and pesticide concentrations were found in the carp, followed by the white sucker, pumpkin seed, and largemouth bass, respectively. Appendix B contains bar graphs for mean location concentrations for each location and each species by contaminant.

Tables

Table 1
Soil and Sediment Screening PCB, Copper, Zinc, Lead, and Barium Concentrations
Cornell Dubilier Electronics Site
South Plainfield, New Jersey
August 1997

Sample Area	Location	Sample Number	PCB Aroclor 1254 (ppb, ww)	Copper (ppm, dw)	Zinc (ppm, dw)	Lead (ppm, dw)	Barium (ppm, dw)
PA4	North Pond	10077	ND	ND	240	ND	260
PA4	North Pond	10078	ND	ND	210	ND	240
PA4	South Pond	10080	13,000	ND	270	ND	230
PA5	Stream	3929	1,800	ND	ND	ND	240
PA5	Stream	3930	1,700	ND	220	130	260
PA5	N. FP	3931	6,200	140	320	350	280
PA5	S. FP	3932	3,400	ND	580	170	190
PA5.5	Stream	10081	1,400	ND	ND	ND	240
PA5.5	Stream	10082	3,700	ND	610	210	380
PA5.5	N. FP	10083	2,800	ND	620	300	280
PA5.5	S. FP	10084	4,600	ND	530	310	350
PA6	Stream	3933	1,100	ND	460	160	280
PA6	Stream	3934	1,400	ND	430	100	280
PA7	Stream	3935	1,300	150	430	170	300
PA7	Stream	10075	680 J	ND	230	73	180
PA8	Stream	10076	ND	210	500	130	250
PA9	Stream	10085	1,800	ND	460	200	280
PA9	Stream	10086	3,900	ND	410	540	300
PA9	S. FP	10087	980 J	ND	590	200	310
PA10	N. FP	10088	1,100	ND	510	420	280
PA11	Stream	10089	ND	ND	190	ND	170
PA11	Stream	10090	680 J	190	600	220	310
PA11	N. FP	10091	1,900	ND	420	130	270
PA12	Stream	10092	700 J	140	350	240	270
PA13	Stream	10093	ND	ND	180	ND	240

Stream = Sediment sample taken from the stream in a depositional area
N. FP = Soil sample collected from the flood plain on the north side of the stream
S. FP = Soil sample collected from the flood plain on the south side of the stream
ppm = parts per million (mg/kg)
ppb = parts per billion (µg/kg)
ww = wet weight
dw = dry weight

Table 2
PCB Concentrations in Edible Fish (Fillet) Samples
Cornell Dubilier Electronics Site
South Plainfield, New Jersey
August 1997

(Results reported in µg/kg, wet weight)

Area	Species	Sample Location	Arochlor 1248	Arochlor 1254
A1	Carp	A1-CC-1	1,300 W	6,200 W
A1	Carp	A1-CC-2	1,200 W	7,300 W
A1	Carp	A1-CC-3	1,700 W	8,100 W
A1	Pumpkin Seed	A1-PS-1	190 W	530 W
A1	Pumpkin Seed	A1-PS-2	1,700 W	4,800 W
A1	Pumpkin Seed	A1-PS-3	110 W	500 W
A1	White Sucker	A1-WS-1	1,600 W	3,600 W
A1	White Sucker	A1-WS-2	140 W	1,000 W
A1	White Sucker	A1-WS-3	760 W	5,800 W
A2	Pumpkin Seed	A2-PS-1	1,300 W	2,700 W
A2	Pumpkin Seed	A2-PS-2	2,000 W	5,000 W
A2	White Sucker	A2-WS-1	2,400 W	5,600 W
A2	White Sucker	A2-WS-2	1,300 W	3,200 W
A2	White Sucker	A2-WS-3	3,800 W	8,400 W
A3	Pumpkin Seed	A3-PS-1	720 W	1,600 W
A3	Pumpkin Seed	A3-PS-2	690 W	1,400 W
A3	Pumpkin Seed	A3-PS-3	1,200 W	2,200 W
A3	White Sucker	A3-WS-1	3,300 W	7,700 W
A3	White Sucker	A3-WS-2	2,200 W	6,000 W
A3	White Sucker	A3-WS-3	2,600 W	5,800 W
A4	Pumpkin Seed	A4-PS-1	200 W	220 W
A4	Pumpkin Seed	A4-PS-2	500 W	2,000 W
A4	Pumpkin Seed	A4-PS-3	1,500 W	2,100 W
A5	Carp	A5-CC-1	6,100 W	16,000 W
A5	Largemouth Bass	A5-LB-1	310 W	740 W
A5	Largemouth Bass	A5-LB-2	340 W	820 W
A5	Largemouth Bass	A5-LB-3	440 W	1,100 W
A5	Pumpkin Seed	A5-PS-1	860 W	1,700 W
A5	Pumpkin Seed	A5-PS-2	620 W	1,500 W
A5	Pumpkin Seed	A5-PS-3	1,200 W	2,300 W
A5	White Sucker	A5-WS-1	3,500 W	12,000 W
A5	White Sucker	A5-WS-2	3,500 W	9,500 W
A5	White Sucker	A5-WS-3	1,500 W	5,600 W
A6	Carp	A6-CC-1	2,700 W	8,200 W
A6	Carp	A6-CC-2	10,000 W	26,000 W
A6	Carp	A6-CC-3	8,900 W	17,000 W
A6	Largemouth Bass	A6-LB-1	250 W	590 W
A6	Largemouth Bass	A6-LB-2	340 W	1,100 W
A6	Largemouth Bass	A6-LB-3	620 W	1,700 W
A6	Pumpkin Seed	A6-PS-1	540 W	1,400 W
A6	Pumpkin Seed	A6-PS-2	470 W	1,200 W
A6	Pumpkin Seed	A6-PS-3	590 W	1,400 W
A9 (ref)	Carp	A9-CC-1	46 W	180 W
A9 (ref)	Carp	A9-CC-2	78 W	290 W
A9 (ref)	Carp	A9-CC-3	85 W	370 W
A9 (ref)	White Sucker	A9-WS-1	510 W	3,100 W
A9 (ref)	White Sucker	A9-WS-2	1,500 W	6,300 W
A9 (ref)	White Sucker	A9-WS-3	48 W	250 W

W = Estimated value, PCB aroclor was weathered

Table 3
Pesticide Concentrations in Edible Fish (Fillet) Samples
Cornell Dubilier Electronics Site
South Plainfield, New Jersey
August 1997

(Results reported in µg/kg, wet weight)

Area	Species	Sample Location	Heptachlor Epoxide	g-Chlordane	a-Chlordane	p,p'-D D E	p,p'-D D D	Endrin Aldehyde	Methoxychlor
A1	Carp	A1-CC-1	29 J	130 EJ	310 J	130 EJ	120 J	3.9 U	3.9 U
A1	Carp	A1-CC-2	46 J	170 EJ	4.1 U	150 EJ	140 EJ	4.1 U	4.1 U
A1	Carp	A1-CC-3	33 J	230 EJ	4.5 U	140 EJ	230 J	3.9 U	3.9 U
A1	Pumpkin Seed	A1-PS-1	4.8 J	3.8 U	3.8 U	8.0 J	3.6 J	3.8 U	3.8 U
A1	Pumpkin Seed	A1-PS-2	44 J	4.0 U	4.0 U	55 J	4.0 U	4.0 U	4.0 U
A1	Pumpkin Seed	A1-PS-3	3.6 J	4.0 U	4.0 U	11 J	4.0 U	4.0 U	4.0 U
A1	White Sucker	A1-WS-1	4.0 U	4.0 U	4.0 U	50 J	4.0 U	4.0 U	4.0 U
A1	White Sucker	A1-WS-2	4.7 J	16 J	29 J	15 J	4.0 U	4.0 U	4.0 U
A1	White Sucker	A1-WS-3	3.8 U	3.8 U	3.8 U	54 J	3.8 U	3.8 U	3.8 U
A2	Pumpkin Seed	A2-PS-1	19 J	3.8 U	3.8 U	27 J	3.8 U	3.8 U	3.8 U
A2	Pumpkin Seed	A2-PS-2	33 J	4.5 U	4.5 U	50 J	4.5 U	4.5 U	4.5 U
A2	White Sucker	A2-WS-1	34 J	4.0 U	4.0 U	58 J	4.0 U	4.0 U	4.0 U
A2	White Sucker	A2-WS-2	19 J	4.0 U	4.0 U	42 J	4.0 U	4.0 U	4.0 U
A2	White Sucker	A2-WS-3	53 J	4.0 U	4.0 U	88 EJ	4.0 U	4.0 U	4.0 U
A3	Pumpkin Seed	A3-PS-1	12 J	4.0 U	4.0 U	16 J	4.0 U	4.0 U	4.0 U
A3	Pumpkin Seed	A3-PS-2	11 J	3.8 U	3.8 U	15 J	3.8 U	3.8 U	3.8 U
A3	Pumpkin Seed	A3-PS-3	19 J	3.8 U	3.8 U	26 J	3.8 U	3.8 U	3.8 U
A3	White Sucker	A3-WS-1	53 J	4.0 U	4.0 U	81 EJ	4.0 U	4.0 U	4.0 U
A3	White Sucker	A3-WS-2	20 J	4.0 U	4.0 U	60 J	4.0 U	4.0 U	4.0 U
A3	White Sucker	A3-WS-3	40 J	3.8 U	3.8 U	82 EJ	3.8 U	3.8 U	3.8 U
A4	Pumpkin Seed	A4-PS-1	3.2 J	3.9 U	3.9 U	12 J	10 J	3.9 U	3.9 U
A4	Pumpkin Seed	A4-PS-2	15 J	4.0 U	4.0 U	22 J	4.0 U	4.0 U	4.0 U
A4	Pumpkin Seed	A4-PS-3	23 J	4.0 U	4.0 U	32 J	4.0 U	4.0 U	4.0 U
A5	Carp	A5-CC-1	3.8 U	3.8 U	3.8 U	3.8 U	3.8 U	110 EJ	3.8 U
A5	Largemouth Bass	A5-LB-1	5.8 J	3.8 U	3.8 U	3.8 U	3.8 U	5.6 J	3.8 U
A5	Largemouth Bass	A5-LB-2	3.8 U	3.8 U	3.8 U	3.8 U	3.8 U	6.1 J	3.8 U
A5	Largemouth Bass	A5-LB-3	3.8 U	3.8 U	3.8 U	3.8 U	3.8 U	7.0 J	3.8 U
A5	Pumpkin Seed	A5-PS-1	20 J	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 BJ
A5	Pumpkin Seed	A5-PS-2	13 J	3.8 U	3.8 U	3.8 U	3.8 U	8.2 J	3.8 U
A5	Pumpkin Seed	A5-PS-3	27 J	3.8 U	3.8 U	3.8 U	3.8 U	11 J	3.8 U
A5	White Sucker	A5-WS-1	4 U	3.8 U	3.8 U	3.8 U	3.8 U	3.8 U	3.8 U
A5	White Sucker	A5-WS-2	55 J	4.0 U	4.0 U	4.0 U	4.0 U	59 J	4.0 U
A5	White Sucker	A5-WS-3	26 J	3.8 U	3.8 U	3.8 U	3.8 U	3.8 U	3.8 U
A6	Carp	A6-CC-1	23 J	3.8 U	3.8 U	82 EJ	3.8 U	3.8 U	3.8 U
A6	Carp	A6-CC-2	110 EJ	3.9 U	3.9 U	310 EJ	3.9 U	3.9 U	3.9 U
A6	Carp	A6-CC-3	84 EJ	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U
A6	Largemouth Bass	A6-LB-1	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.7 J	4.0 U
A6	Largemouth Bass	A6-LB-2	4.8 J	3.8 U	3.8 U	11 J	3.8 U	3.8 U	3.8 U
A6	Largemouth Bass	A6-LB-3	7.2 J	3.8 U	3.8 U	20 J	3.8 U	3.8 U	3.8 U
A6	Pumpkin Seed	A6-PS-1	9.0 J	3.8 U	3.8 U	13 J	3.8 U	3.8 U	3.8 U
A6	Pumpkin Seed	A6-PS-2	6.3 J	4.0 U	4.0 U	9.0 J	4.0 U	4.0 U	4.0 U
A6	Pumpkin Seed	A6-PS-3	10 J	4.0 U	4.0 U	13 J	4.0 U	4.0 U	4.0 U
A9 (ref)	Carp	A9-CC-1	1.4 J	8.0 J	16 J	4.0 U	2.9 J	4.0 U	4.0 U
A9 (ref)	Carp	A9-CC-2	3.6 J	27 J	78 J	15 J	7.6 J	3.8 U	3.8 U
A9 (ref)	Carp	A9-CC-3	2.8 J	19 J	35 J	9.0 J	5.8 J	4.8 U	4.8 U
A9 (ref)	White Sucker	A9-WS-1	15 J	4.0 U	4.0 U	40 J	4.0 U	4.0 U	4.0 U
A9 (ref)	White Sucker	A9-WS-2	21 J	4.0 U	4.0 U	48 J	4.0 U	4.0 U	4.0 U
A9 (ref)	White Sucker	A9-WS-3	1.7 J	5.5 J	11 J	5.0 J	2.0 J	4.0 U	4.0 U

U = Not detected, value denotes detection limit
J = Estimated value
B = Compound was detected in the laboratory blank
E = Estimated value, concentrations exceeds linear calibration range

Table 4
Summary Statistics for PCBs Detected in Edible (Fillet) Fish Tissue
Cornell Dubilier Electronics Site
South Plainfield, New Jersey
August 1997

(Results reported in µg/kg, wet weight)

Arochlor 1248				
Location	Carp	Pumpkin Seed	White Sucker	Largemouth Bass
A1	1,400 (265) (n = 3)	667 (896) (n = 3)	833 (733) (n = 3)	
A2		1,650 (495) (n = 2)	2,500 (1,253) (n = 3)	
A3		870 (286) (n = 3)	2,700 (557) (n = 3)	
A4		733 (681) (n = 3)		
A5	6,100 (0.00) (n = 1)	893 (291) (n = 3)	2,833 (1,155) (n = 3)	
A6	7,200 (3,936) (n = 3)	533 (60.3) (n = 3)		363 (68) (n = 3)
A7				403 (193) (n = 3)
A9 (Ref)	70 (20.80) (n = 3)		686 (742) (n = 3)	

Arochlor 1254				
Location	Carp	Pumpkin Seed	White Sucker	Largemouth Bass
A1	7,200 (954) (n = 3)	1,943 (2,474) (n = 3)	3,467 (2,403) (n = 3)	
A2		3,850 (1,626) (n = 2)	5,733 (2,603) (n = 3)	
A3		1,733 (416) (n = 3)	6,500 (1,044) (n = 3)	
A4		1,440 (1058) (n = 3)		
A5	16,000 (0.00) (n = 1)	1,833 (416) (n = 3)	9,033 (3,225) (n = 3)	
A6	17,067 (8900) (n = 3)	1,333 (115.5) (n = 3)		887 (189) (n = 3)
A7				1,130 (556) (n = 3)
A9 (Ref)	280 (95.4) (n = 3)		3,217 (3,027) (n = 3)	

Mean; (Standard Deviation [n-1]); (n = Sample Size)
A value of one-tenth the detection limit was used in calculations for values below the detection limit

Table 5
Summary Statistics for Pesticides Detected in Edible (Fillet) Fish Tissue
Cornell Dubilier Electronics Site
South Plainfield, New Jersey
August 1997

(Results reported in µg/kg, wet weight)

Heptachlor Epoxide				
Location	Carp	Pumpkin Seed	White Sucker	Largemouth Bass
A1	35.8 (8.99) (n = 3)	17.5 (23) (n = 3)	1.8 (2.48) (n = 3)	
A2		25.9 (9.32) (n = 2)	35.2 (16.78) (n = 3)	
A3		14.3 (4.42) (n = 3)	37.5 (16.74) (n = 3)	
A4		13.8 (9.89) (n = 3)		
A5	0.4 (0.00) (n = 1)	20.7 (7.09) (n = 3)	27.1 (27.30) (n = 3)	
A6	72.3 (44.80) (n = 3)	8.3 (1.74) (n = 3)		2.2 (3.11) (n = 3)
A9 (Ref)	2.6 (1.08) (n = 3)		12.6 (9.85) (n = 3)	4.1 (3.45) (n = 3)

g-Chlordane				
Location	Carp	Pumpkin Seed	White Sucker	Largemouth Bass
A1	177 (50.30) (n = 3)	0.4 (0.01) (n = 3)	5.6 (9.02) (n = 3)	
A2		0.4 (0.05) (n = 2)	0.4 (0.00) (n = 3)	
A3		0.4 (0.01) (n = 3)	0.4 (0.01) (n = 3)	
A4		0.4 (0.00) (n = 3)		
A5	0.4 (0.00) (n = 1)	0.4 (0.01) (n = 3)	0.4 (0.01) (n = 3)	0.4 (0.00) (n = 3)
A6	0.4 (0.02) (n = 3)	0.4 (0.01) (n = 3)		0.4 (0.01) (n = 3)
A9 (Ref)	18.1 (9.70) (n = 3)		2.1 (2.92) (n = 3)	

a-Chlordane				
Location	Carp	Pumpkin Seed	White Sucker	Largemouth Bass
A1	104 (179) (n = 3)	0.4 (0.01) (n = 3)	9.9 (16.40) (n = 3)	
A2		0.4 (0.05) (n = 2)	0.4 (0.00) (n = 3)	
A3		0.4 (0.01) (n = 3)	0.4 (0.01) (n = 3)	
A4		0.4 (0.00) (n = 3)		
A5	0.4 (0.00) (n = 1)	0.4 (0.01) (n = 3)	0.4 (0.01) (n = 3)	0.4 (0.00) (n = 3)
A6	0.4 (0.02) (n = 3)	0.4 (0.01) (n = 3)		0.4 (0.01) (n = 3)
A9 (Ref)	42.8 (31.60) (n = 3)		3.9 (6.08) (n = 3)	

Mean; (Standard Deviation [n-1]); (n = Sample Size)
A value of one-tenth the detection limit was used in calculations for values below the detection limit

Table 5 (Continued)
Summary Statistics for Pesticides Detected in Edible (Fillet) Fish Tissue
Cornell Dubilier Electronics Site
South Plainfield, New Jersey
August 1997

(Results reported in µg/kg, wet weight)

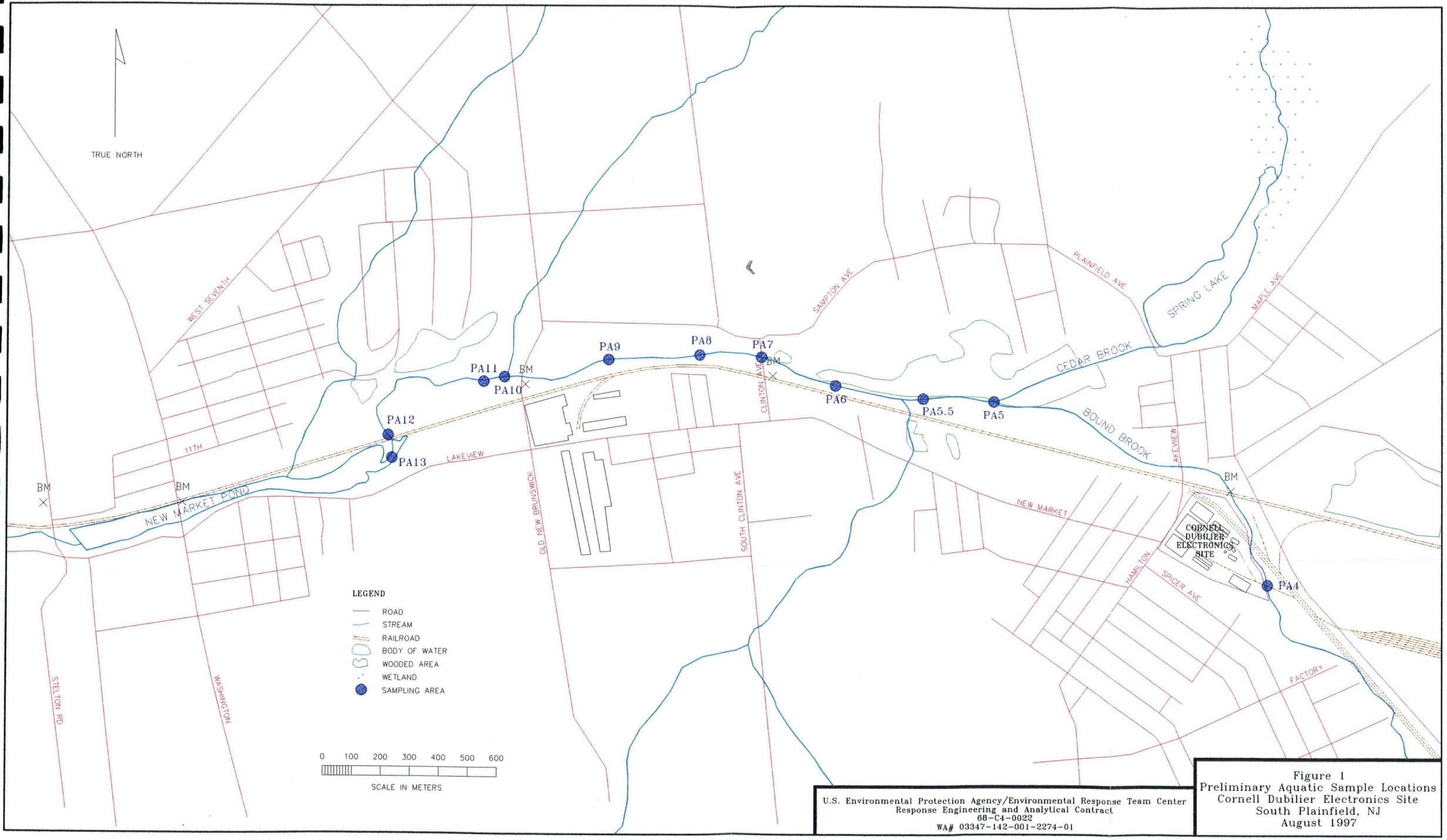
p,p'-D D E				
Location	Carp	Pumpkin Seed	White Sucker	Largemouth Bass
A1	140 (10.0) (n = 3)	24.6 (26.4) (n = 3)	39.7 (21.46) (n = 3)	
A2		38.7 (16.1) (n = 2)	62.7 (23.5) (n = 3)	
A3		19 (6.06) (n = 3)	74.5 (12.53) (n = 3)	
A4		21.9 (10.4) (n = 3)		
A5	0.4 (0.00) (n = 1)	0.4 (0.01) (n = 3)	0.4 (0.01) (n = 3)	0.4 (0.00) (n = 3)
A6	131 (160.5) (n = 3)	11.6 (2.31) (n = 3)		10.4 (9.63) (n = 3)
A9 (Ref)	8.2 (7.39) (n = 3)		31 (22.90) (n = 3)	

p,p'-D D D				
Location	Carp	Pumpkin Seed	White Sucker	Largemouth Bass
A1	163 (58.6) (n = 3)	1.5 (1.83) (n = 3)	0.4 (0.01) (n = 3)	
A2		0.4 (0.05) (n = 2)	0.4 (0.00) (n = 3)	
A3		0.4 (0.01) (n = 3)	0.4 (0.01) (n = 3)	
A4		3.7 (5.74) (n = 3)		
A5	0.4 (0.00) (n = 1)	0.4 (0.01) (n = 3)	0.4 (0.01) (n = 3)	0.4 (0.00) (n = 3)
A6	0.4 (0.02) (n = 3)	0.4 (0.01) (n = 3)		0.4 (0.01) (n = 3)
A9 (Ref)	5.4 (2.38) (n = 3)		0.9 (0.92) (n = 3)	

Endrin Aldehyde				
Location	Carp	Pumpkin Seed	White Sucker	Largemouth Bass
A1	0.4 (0.01) (n = 3)	0.4 (0.01) (n = 3)	0.4 (0.01) (n = 3)	
A2		0.4 (0.05) (n = 2)	0.4 (0.00) (n = 3)	
A3		0.4 (0.01) (n = 3)	0.4 (0.01) (n = 3)	
A4		0.4 (0.00) (n = 3)		
A5	110 (0.00) (n = 1)	6.4 (5.38) (n = 3)	20.1 (34.1) (n = 3)	6.2 (0.72) (n = 3)
A6	0.4 (0.02) (n = 3)	0.4 (0.01) (n = 3)		1.8 (2.48) (n = 3)
A9 (Ref)	0.4 (0.06) (n = 3)		0.4 (0.00) (n = 3)	

Mean; (Standard Deviation [n-1]); (n = Sample Size)
A value of one-tenth the detection limit was used in calculations for values below the detection limit

Figures



U.S. Environmental Protection Agency/Environmental Response Team Center
Response Engineering and Analytical Contract
68-C4-0022
WA# 03347-142-001-2274-01

Figure 1
Preliminary Aquatic Sample Locations
Cornell Dubilier Electronics Site
South Plainfield, NJ
August 1997

TRUE NORTH

WEST SEVENTH

11TH

SAMPTON AVE

PLAINFIELD AVE

SPRING LAKE

MAPLE AVE

CEDAR BROOK

BOUND BROOK

AKEVIEW

BM

A4

A3

CLINTON AVE

A2

A5

LAKEVIEW

NEW MARKET POND

A6

A7

OLD NEW BRUNSWICK

SOUTH CLINTON AVE

NEW MARKET

HAMILTON

SPICER AVE

CORNELL DUBILIER ELECTRONICS SITE

A1

FACTORY

A9 (REF)

STELTON RD

WASHINGTON

LEGEND

- ROAD
- STREAM
- RAILROAD
- BODY OF WATER
- WOODED AREA
- WETLAND
- AQUATIC SAMPLING AREA

0 100 200 300 400 500 600

SCALE IN METERS

U.S. Environmental Protection Agency/Environmental Response Team Center
Response Engineering and Analytical Contract
68-C4-0022
WA# 03347-142-001-2274-01

Figure 2
Aquatic Sample Locations
Cornell Dubilier Electronics Site
South Plainfield, NJ
August 1997

APPENDIX A

FISH METRICS

Fish Metrics
Cornell Dubilier Electronics Site
South Plainfield, New Jersey
August 1997

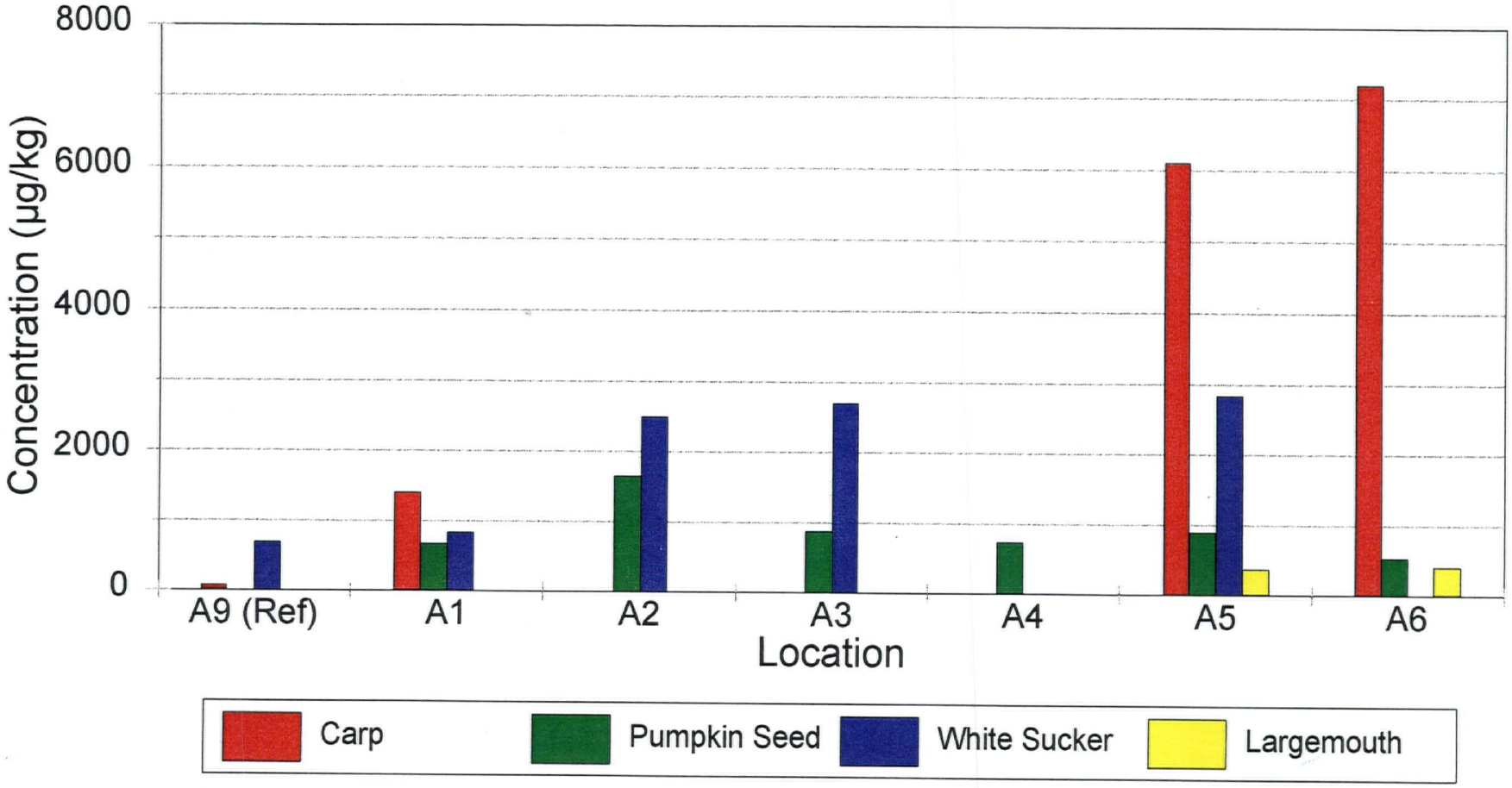
Area	Species	Sample Location	Total Length	Fork Length	Standard Length	Total Weight	Fillet Weight	Comments
A1	Carp	A1-CC-1	58	54	48	482	NA	
A1	Carp	A1-CC-2	57	51	48	539	NA	
A1	Carp	A1-CC-3	55	50	45	542	NA	
A1	Pumpkin Seed	A1-PS-1	13	12.5	11	60.4	21.1	
A1	Pumpkin Seed	A1-PS-2	12	11.7	10	46.1	16.5	
A1	Pumpkin Seed	A1-PS-3	[9]	[9]	[9]	[41.1]	15.3	No Tail
A1	White Sucker	A1-WS-1	24	23	20	160	63.1	
A1	White Sucker	A1-WS-2	25	23	21	176.9	66.7	
A1	White Sucker	A1-WS-3	21	20	18	108.4	NA	
A2	Pumpkin Seed	A2-PS-1	13	12.5	11.5	67.1	17.7	
A2	Pumpkin Seed	A2-PS-2	12	11.5	10	39.2	15	
A2	Pumpkin Seed	A2-PS-3	10.5	10	8.5	22	NA	
A2	White Sucker	A2-WS-1	38	36	33	654	214.7	
A2	White Sucker	A2-WS-2	33	31	28	392	148.2	
A2	White Sucker	A2-WS-3	31	29	26	331	130.8	
A3	Pumpkin Seed	A3-PS-1	16	15.5	13.5	110.1	20.8	
A3	Pumpkin Seed	A3-PS-2	15	14	12.5	80.7	17.1	
A3	Pumpkin Seed	A3-PS-3	11	10.5	10	36.2	15.2	
A3	White Sucker	A3-WS-1	38	35	32	631	155.7	
A3	White Sucker	A3-WS-2	35	32	29	459.5	111.4	
A3	White Sucker	A3-WS-3	34	32	29	397.8	85.3	
A4	Pumpkin Seed	A4-PS-1	14	13.5	12	54.8	15.5	
A4	Pumpkin Seed	A4-PS-2	13	12.5	11.5	56.6	16.1	
A4	Pumpkin Seed	A4-PS-3	13.5	13	11.5	50.4	16.3	
A5	Carp	A5-CC-1	51	46	42	NA	261.1	right side fillet
A5	Largemouth Ba	A5-LB-1	36.5	35	31	625.5	163.9	
A5	Largemouth Ba	A5-LB-2	26.5	25.3	23	242	82	
A5	Largemouth Ba	A5-LB-3	24.2	23.5	20.5	209	69	
A5	Pumpkin Seed	A5-PS-1	14.2	13.8	11.5	59.9	22.2	
A5	Pumpkin Seed	A5-PS-2	13.8	13.2	11.3	68.8	23.1	
A5	Pumpkin Seed	A5-PS-3	14	13.5	11.5	70.5	21.8	
A5	White Sucker	A5-WS-1	39	36.5	32.5	608	152.5	
A5	White Sucker	A5-WS-2	40	37	34	667.9	159.8	
A5	White Sucker	A5-WS-3	36	34	32	536.4	174.2	
A6	Carp	A6-CC-1	65	61	53	NA	380	right side fillet
A6	Carp	A6-CC-2	57	52.5	48.5	NA	174.8	right side fillet
A6	Carp	A6-CC-3	54	49	45	NA	266.2	right side fillet
A6	Largemouth Ba	A6-LB-1	30	31.5	25	431.1	98.1	
A6	Largemouth Ba	A6-LB-2	41	36	34	1007.6	245.2	
A6	Largemouth Ba	A6-LB-3	28	26	24	381.8	100.8	
A6	Pumpkin Seed	A6-PS-1	16.5	15.5	13.5	102.3	25	
A6	Pumpkin Seed	A6-PS-2	16.5	15.5	13	96.8	NA	
A6	Pumpkin Seed	A6-PS-3	13	12.5	11	47	15.6	
A9	Carp	A9-CC-1	15	13.5	12	67.6	17.2	
A9	Carp	A9-CC-2	14.5	13.5	11.5	49	15.1	
A9	Carp	A9-CC-3	13	12	10.5	37.5	15	
A9	White Sucker	A9-WS-1	36	33	30	505.8	146.4	
A9	White Sucker	A9-WS-2	36	34	30	517	162.4	
A9	White Sucker	A9-WS-3	30	29	25	326.1	96.3	

All lengths are in millimeters (mm); weights are in grams (g)

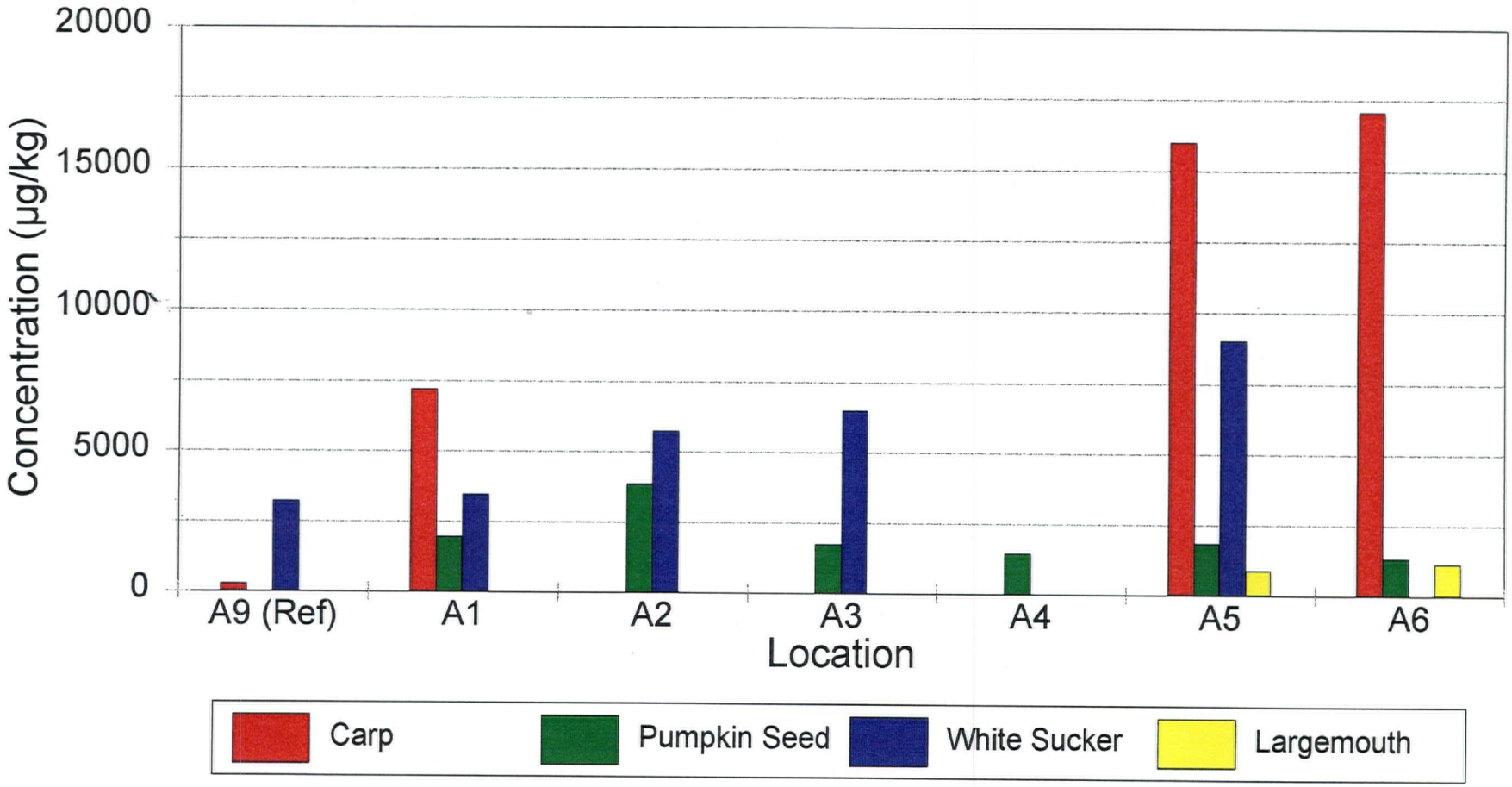
APPENDIX B

COMPARATIVE BAR GRAPHS

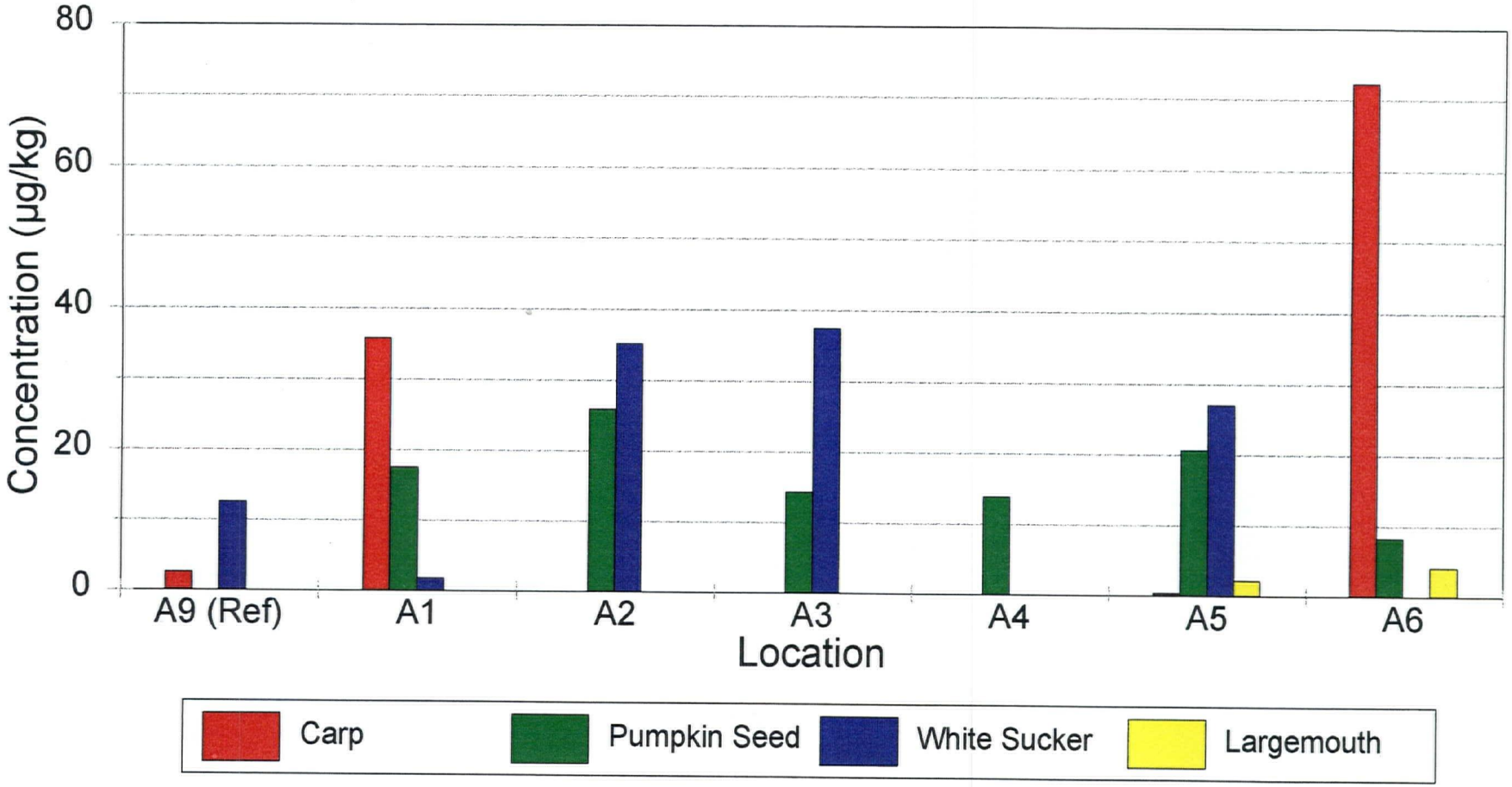
Arochlor 1248



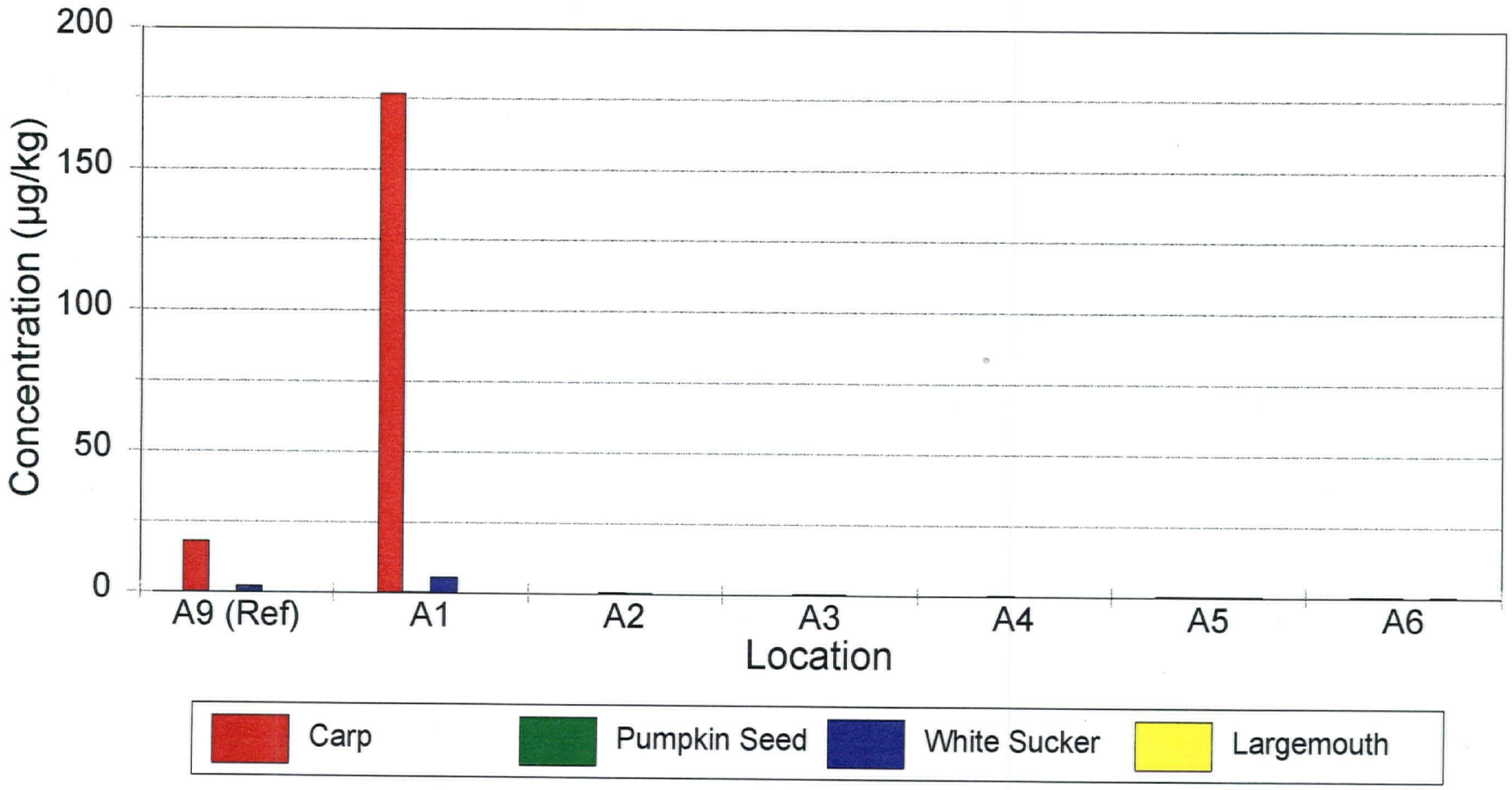
Arochlor 1254



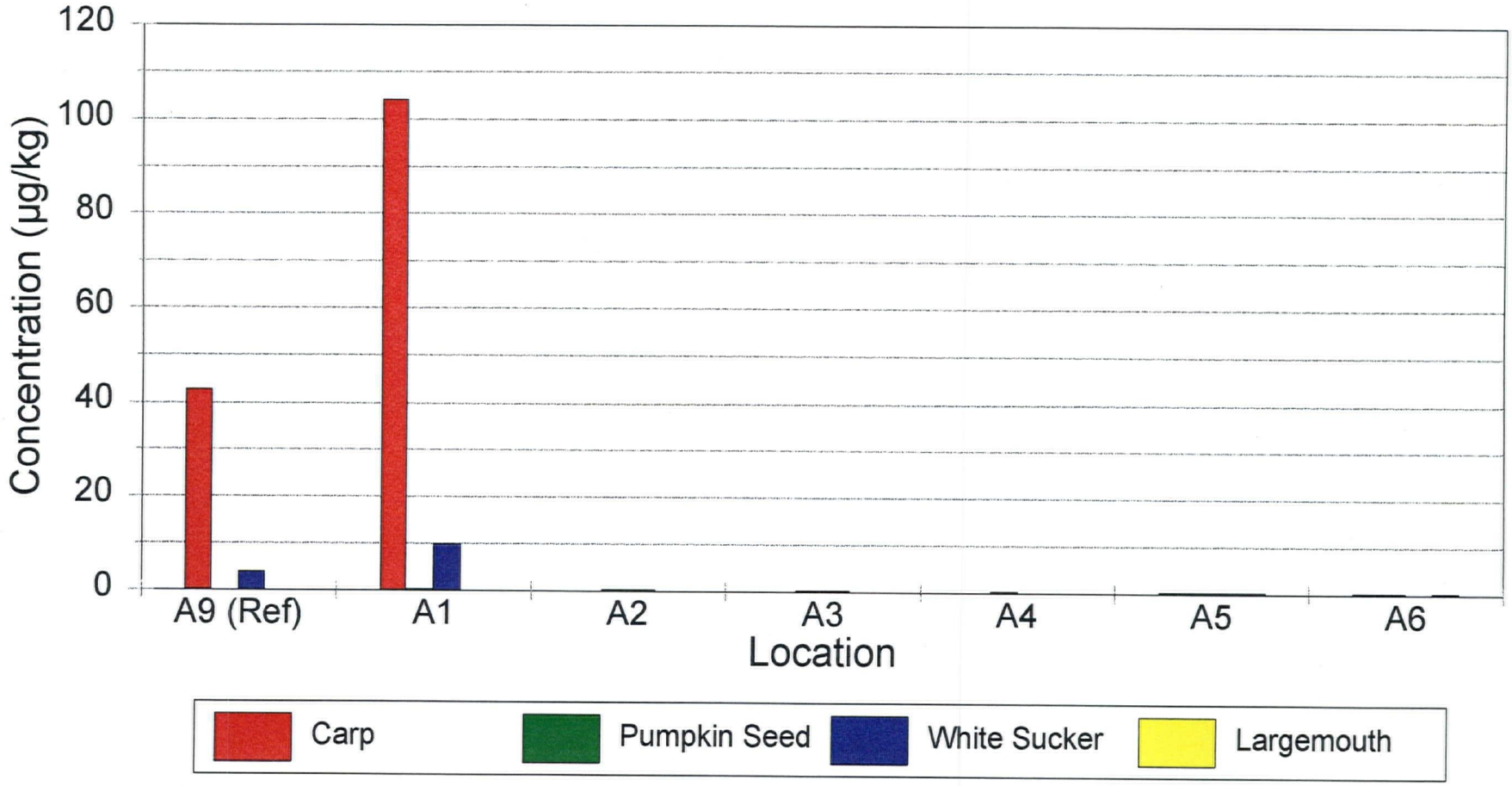
Heptachlor Epoxide



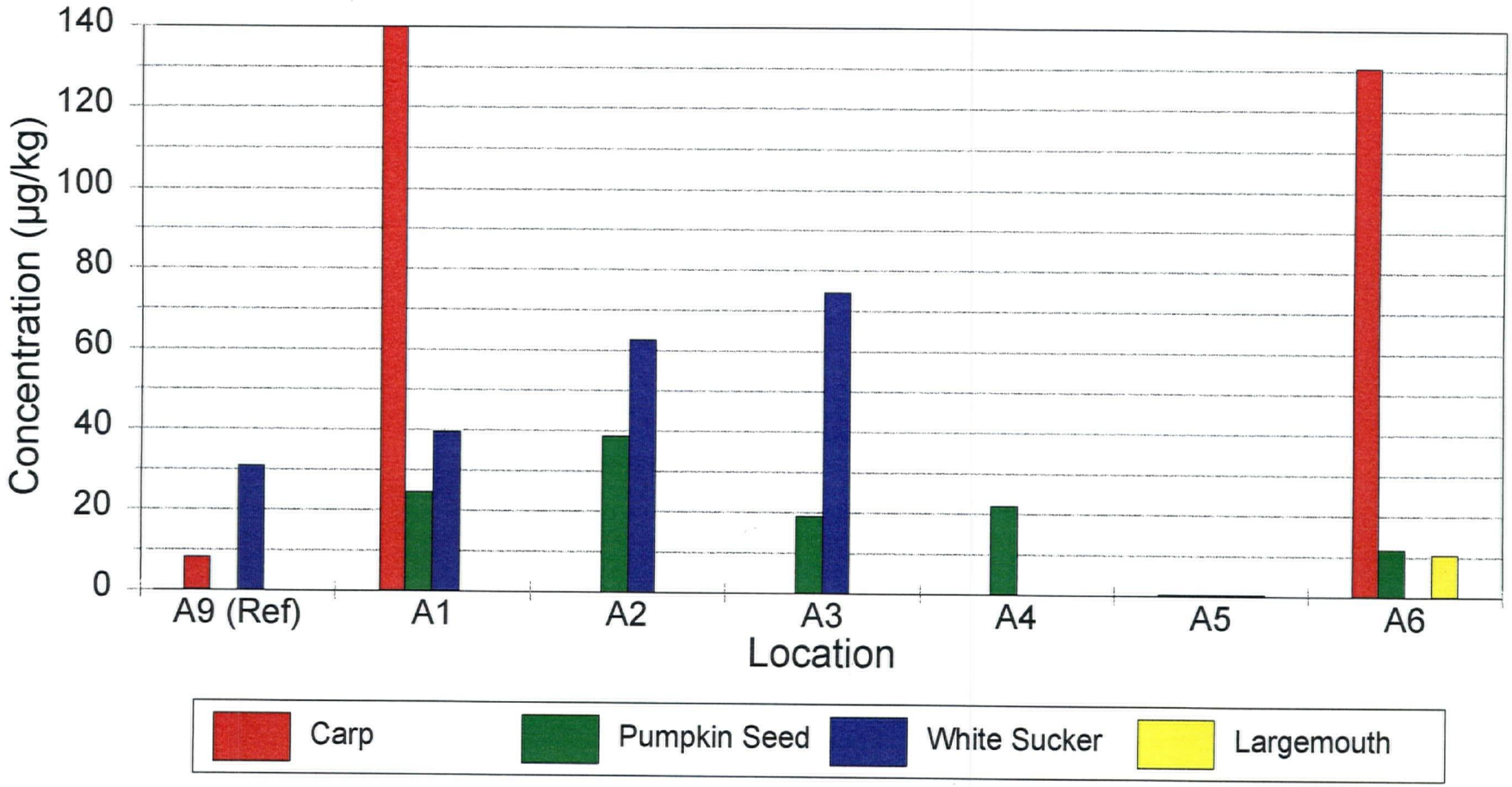
g-Chlordane


200
150
100
50
0
Concentration (µg/kg)
A9 (Ref)
A1
A2
A3
A4
A5
A6
Location
Carp
Pumpkin Seed
White Sucker
Largemouth

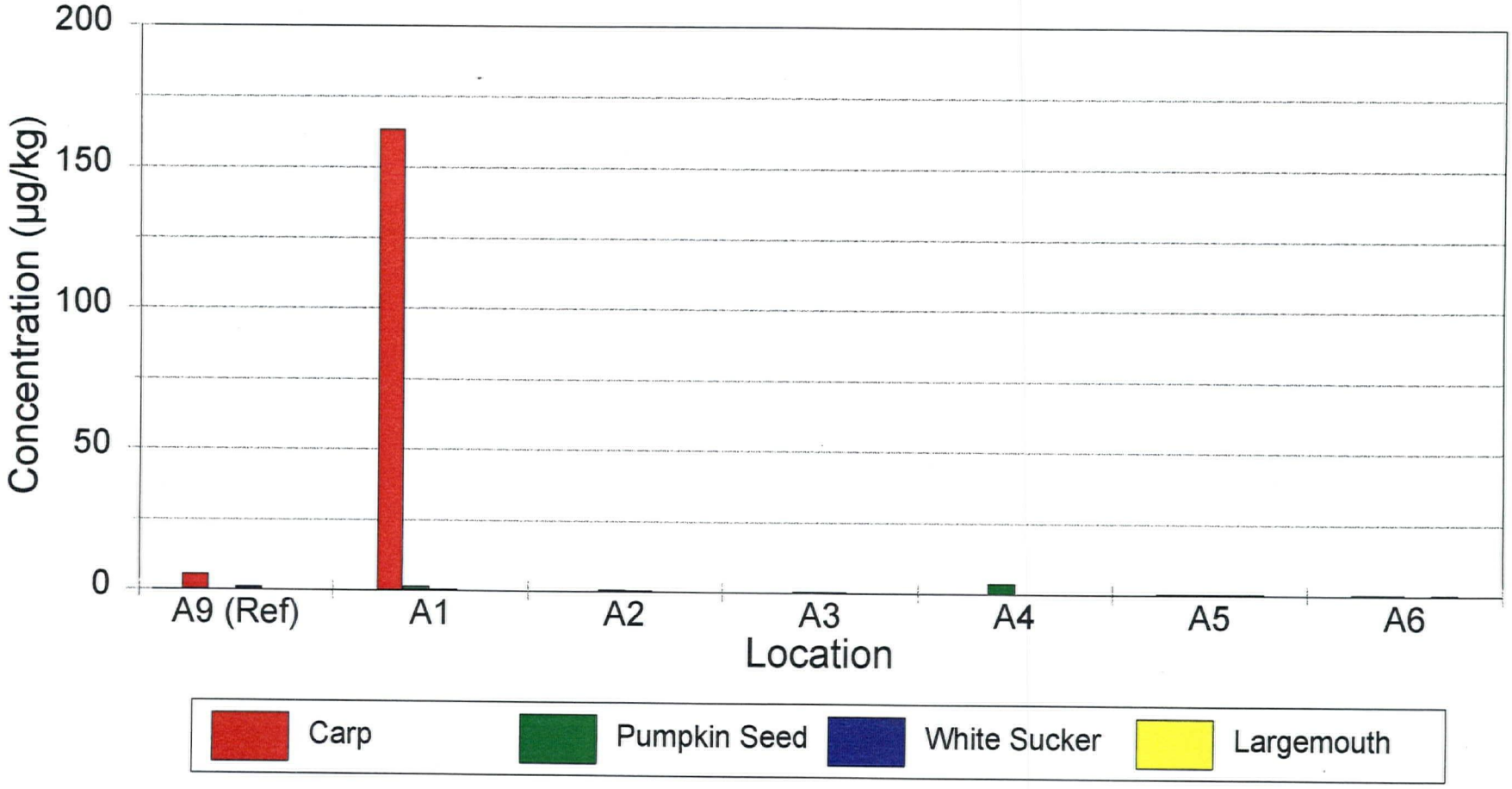
a-Chlordane


120
100
80
60
40
20
0
Concentration (µg/kg)
A9 (Ref)
A1
A2
A3
A4
A5
A6
Location
Carp
Pumpkin Seed
White Sucker
Largemouth

p,p'-D D E


140
120
100
80
60
40
20
0
Concentration (µg/kg)
A9 (Ref)
A1
A2
A3
A4
A5
A6
Location
Carp
Pumpkin Seed
White Sucker
Largemouth

p,p'-D D D


200
150
100
50
0
Concentration (µg/kg)
A9 (Ref)
A1
A2
A3
A4
A5
A6
Location
Carp
Pumpkin Seed
White Sucker
Largemouth

Endrin Aldehyde